REMARKS

Applicants have now had an opportunity to carefully consider the Examiner's comments set forth in the Office Action of July 30, 2004.

Reconsideration of the Application is requested.

The Office Action

The Examiner rejected claims 1, 3-4, 8-9, and 13 under 35 U.S.C. §102(b) as being anticipated by "Introducing SuperPrint: Software for Better Windows Printing" ("the SuperPrint Manual"). Claims 2, 5-7, and 10-12 were objected to as being dependent on a rejected base claim, but would be allowable if rewritten in independent form.

Claims 1-13 remain in this application. Claims 1-9 have been amended to correct certain informalities. The specification has been amended to correct informalities regarding spelling.

Brief Description

The disclosure relates to a method and system of individualizing tone-reproduction curves (TRC) calibration and applying the individualized TRCs. In a typical printing system, printer output devices produce color and black-and-white tones to produce images. The printing device accepts color level specifications (typically CMYK levels) as an input and produces corresponding color areas on a printed page. While the input color level specifications may vary linearly, a linear change in color output levels typically does not result because of changing variables such as humidity, temperature and dust count, etc. in the printing environment. One method to account for the nonlinearities caused by the printing environment is to use calibrated TRCs. In calibration, the actual output of the printing device is measured and a relationship between the input and output is established and stored. This relationship, i.e. the TRC, is then used to produce more accurate output. However, as time passes, many of the environmental variables change, resulting in drifts in the printing device output. These drifts require re-calibration of the TRCs. It should be noted that since TRC calibration is performed using actual printer output, choices in media, halftoning, inks, and other variables also effect TRC calibration. To produce the most accurate output, ideally a different set of TRCs would be produced for each different combination of variables, i.e. media type, halftone pattern, ink, etc. However, calibrating TRCs for multiple variables and then re-calibrating each of them to account for print output drift as time passes is costly and time consuming. It would thus be an advantage to produce calibrated TRCs for different sets of variables and then relate,

i.e. map, those TRCs to a reference. Then, all the TRCs may be recalibrated by recalibrating only the reference and relating the reference back to the TRCs. Accordingly, one exemplary embodiment of the present disclosure maintains a plurality of predetermined stored TRCs, each of which corresponds to a distinct media and halftone type combination. These stored TRCs are then related to a reference media and reference halftone combination through predetermined relationships (mappings). A new, recalibrated, TRC corresponding to the reference media and halftone type combination is generated, and the predetermined stored TRCs are updated using the predetermined relationships.

The Cited Art

The SuperPrint Manual, cited by the Examiner, teaches changing image characteristics through user-manipulated "settings". For each printer, Zenographics provides predetermined optimal settings, which have been determined "using the manufacturer's ink and paper." (See p. 16). However, the Examiner will appreciate that the manufacturer has provided only one set of settings, i.e. those made using a manufacturer-defined set of variables in a controlled environment. Indeed, this process is the typical process. The printer manufacturer produces one set of TRCs that accounts for all the nonlinearities present in the printer. The SuperPrint Manual does not teach or otherwise disclose recalibration methods or procedures. Rather, the SuperPrint Manual describes a different process whereby the end user manipulates halftoning and saturation and hue values in the original image in order to achieve the best output for a certain media type. These values may then be saved as a user-defined and user-named "setting" for later recall. (See p. 21, paragraph 7). These user-manipulated settings are then used with the manufacturer's factory-predefined TRCs. The Examiner will appreciate these two different methods of accounting for printer drift. The first method is to change input image characteristics and use the same TRCs produced by the manufacturer to adjust for printer drift. This is the method used in the SuperPrint Manual. The second method is to keep the input image the same and recalibrate the TRCs for different media and halftoning type combinations. This latter method is the method used in the present disclosure.

The Claims are Patentably Distinguished Over the Cited Reference.

The SuperPrint Manual does not teach recalibration of TRCs for different media type and halftoning type combinations. As noted above, the SuperPrint manual teaches

that a printer's default dot gain has been pre-calculated at the factory using manufacturer-supplied printer, paper, and ink or toner. (See p.20, paragraph 2). Then, the user uses various tabs and control panels to make changes to saturation, hue, halftoning type, and others in the original image. (See pp. 16-18). These user defined settings may then be saved under user-selected profile names, e.g. "glossy photo", "word processing", etc. (See p. 21, paragraph 7). However, the Examiner will appreciate that no recalibration of the printing device occurs under the SuperPrint scheme. Rather, the user changes variables (e.g. saturation, hue, etc.) before sending the output to the printer. Thus, the SuperPrint manual does not show a plurality of predetermined stored calibrated TRC curves, i.e. curves that have been *calibrated* for various media and media/halftone combinations. Neither does the SuperPrint manual show predetermined relationships between the stored calibrated TRCs and a reference media type. Neither does it show generating a new TRC corresponding to the reference media type or updating each predetermined stored calibrated TRC curve based on its relationship with the reference media. By contrast, claims 1, 4, and 9 of the present invention relate to a method for updating individualized calibrated TRCs whereby a plurality of predetermined relationships between each stored calibrated TRC and a reference media type and halftoning type combination are provided. These stored calibrated TRCs and predetermined relationships are not present in the SuperPrint Manual. As such, claims 1, 4, and 9 are patentably distinguished from the cited reference, and are in proper condition for allowance. Moreover, since all other claims depend from claims 1, 4, or 9, all other claims should also be in proper condition for allowance.

CONCLUSION

For the reasons detailed above, it is submitted all claims remaining in the application (Claims 1-13) are now in condition for allowance. The foregoing comments do not require unnecessary additional search or examination.

In the event the Examiner considers personal contact advantageous to the disposition of this case, he/she is hereby authorized to call Pat Roche, at Telephone Number (216) 861-5582.

Respectfully submitted,

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10/22/04
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